PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
ARP2159

SOUND FIELD PROCESSOR

SP-Z570

- **Refer to the service manual ARP1909, SP-Z560/ZEBZ.**
- **This manual is applicable to the SP-Z570/ZEBZ type.**
- **This product is a component of systems. As to the system composition, refer to the system manuals.**
- **This product does not function properly when independent ; to avoid malfunctions, be sure to connect it to the prescribed system components, otherwise damage may result.**

CONTRAST OF MISCELLANEOUS PARTS

SP-Z570/ZEBZ type is the same as the SP-Z560/ZEBZ type with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		SP-Z560/ZEBZ	SP-Z570/ZEBZ	
	Rotaly knob	AAA1005	AAA1003	
	Equalizer button	AAD1681	AAD1608	
	EQ mode button	AAD1683	AAD1610	
	DES button	AAD1684	AAD1611	
	SFC mode button	AAD1685	AAD1612	
	Display panel	AAK1852	AAK2118	
	Code with plug	ADE1072	ADE1109	
	Packing case	AHD1779	AHD2011	
	Front panel assembly	AMB1579	AMB1776	

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911
© PIONEER ELECTRONIC CORPORATION 1991
FV JAN. 1991 Printed in Japan

1. P.C.B.'S PART LIST

NOTES:
- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56×10 1→561*	*RD1/4PS000J*
47kΩ	*47×10 3→473*	*RD1/4PS000J*
0.5Ω	*OR5*	*RN2H000K*
1Ω	*010*	*RS1P000K*

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*563×10 1→5621*	*RN1/4R0000F*

Mark NO	Description	Part NO

SFC CONTROL ASSEMBLY (AWK1232)
SFC CONTROL Assembly is split into CONTROL Assembly and Display Assembly.

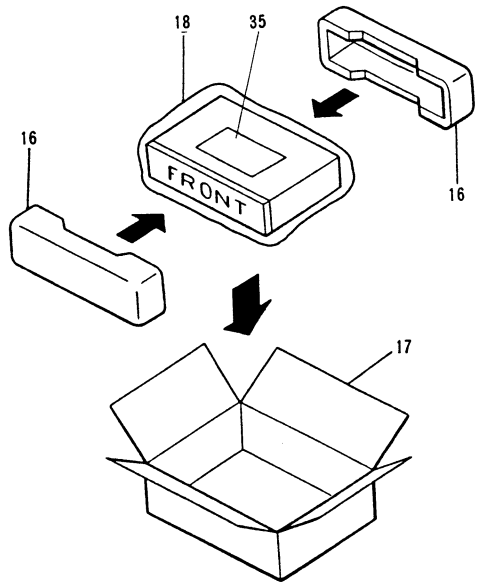
DISPLAY ASS'Y		
SEMICONDUCTORS		
	IC251 FL DRIVER IC	MSC7112-01SS
	D251-266 DIODE	HSS104-02
	D267,268 LED(RED)	AEL1099
SWITCHES		
	S251-277 SWITCH	ASG1029
	S278 SWITCH	ASG-711
	S279-291 SWITCH	ASG1029
	S292 ROTARY ENCODER	ASX1007
CAPACITOR		
	C101,102 CERAMIC CAPACITOR	CKCYX823M25
	C103 CERAMIC CAPACITOR	CKCYX473M25
	C104,105 CERAMIC CAPACITOR	CKCYX333M25
	C106 CERAMIC CAPACITOR	CKCYX473M25
	C107,108 CERAMIC CAPACITOR	CKCYX123M25
	C109 CERAMIC CAPACITOR	CKCYX473M25
	C110,111 CERAMIC CAPACITOR	CKCYB472K50
	C112 CERAMIC CAPACITOR	CKCYX473M25
	C113,114 CERAMIC CAPACITOR	CKCYB182K50
	C115 CERAMIC CAPACITOR	CKCYX473M25
	C116,117 CERAMIC CAPACITOR	CKCYB821K50
	C118 CERAMIC CAPACITOR	CKCYX473M25
	C119,120 CERAMIC CAPACITOR	CKCYB391K50
	C121,122 CERAMIC CAPACITOR	CKCYX473M25
	C123 ELECTR.CAPACITOR	CEAS221M10
	C124 (0.022μ)	ACG1022
	C125 CEA (47000/5.5V)	ACH1070
	C126 ELECTR.CAPACITOR	CEAS100M25
	C127 ELECTR.CAPACITOR	CEAS221M10
	C128 AUDIO FILM CAPACITOR	RCFTXA104J50
RESISTOR		
	R251-273 CARBONFILM RESISTOR	RD1/8PM□□□J

OTHERS		
	CN1 13P JUMPER CONNECTOR	KPE13
	V251 FL TUBE	AAV1083
	X101 CERAMIC RESONATOR (4.00MHz)	ASS1010
CONTROL ASS'Y		
SEMICONDUCTORS		
	IC101-106 OP-AMP IC	NJM4558DXP
	IC107 LOGIC IC	TC4061BP
	IC108	PD3141
	Q101-103 TRANSISTOR	DTC124ES
	Q104-106 TRANSISTOR	2SC2458
	Q107-113 TRANSISTOR	DTC124ES
	Q114 TRANSISTOR	2SA1048
	Q115 TRANSISTOR	2SC2458
	Q116 TRANSISTOR	DTC124ES
	D101-117 DIODE	HSS104-02
	D118 ZENER DIODE	RD5.6ESB2
	D119,120 DIODE	HSS104-02
COIL & FILTER & TRANSFORMERS		
	L101 AXIAL INDUCTOR	LAU221K
	L102 AXIAL INDUCTOR	LAU560K
CAPACITOR		
	C251 CERAMIC CAPACITOR(0.022μ)	ACG1022
	C252 CERAMIC CAPACITOR(100P)	ACG1017
	C253 ELECTROLYTIC CAPACITOR	CEJA101M10
	C254 CERAMIC CAPACITOR(0.01μ)	ACG1021
	C255 CERAMIC CAPACITOR (330P)	ACG1018
	C256 CERAMIC CAPACITOR(1000P)	ACG1020
	C257 ELECTROLYTIC CAPACITOR	CEJA101M10
RESISTOR		
	R101-168 CARBONFILM RESISTOR	RD1/8PM□□□J
⚠	R169 METAL OXIDE RESISTOR	RRS2LMF681J
	R170-189 CARBONFILM RESISTOR	RD1/8PM□□□J
	R201-218 CARBONFILM RESISTOR	RD1/8PM104J

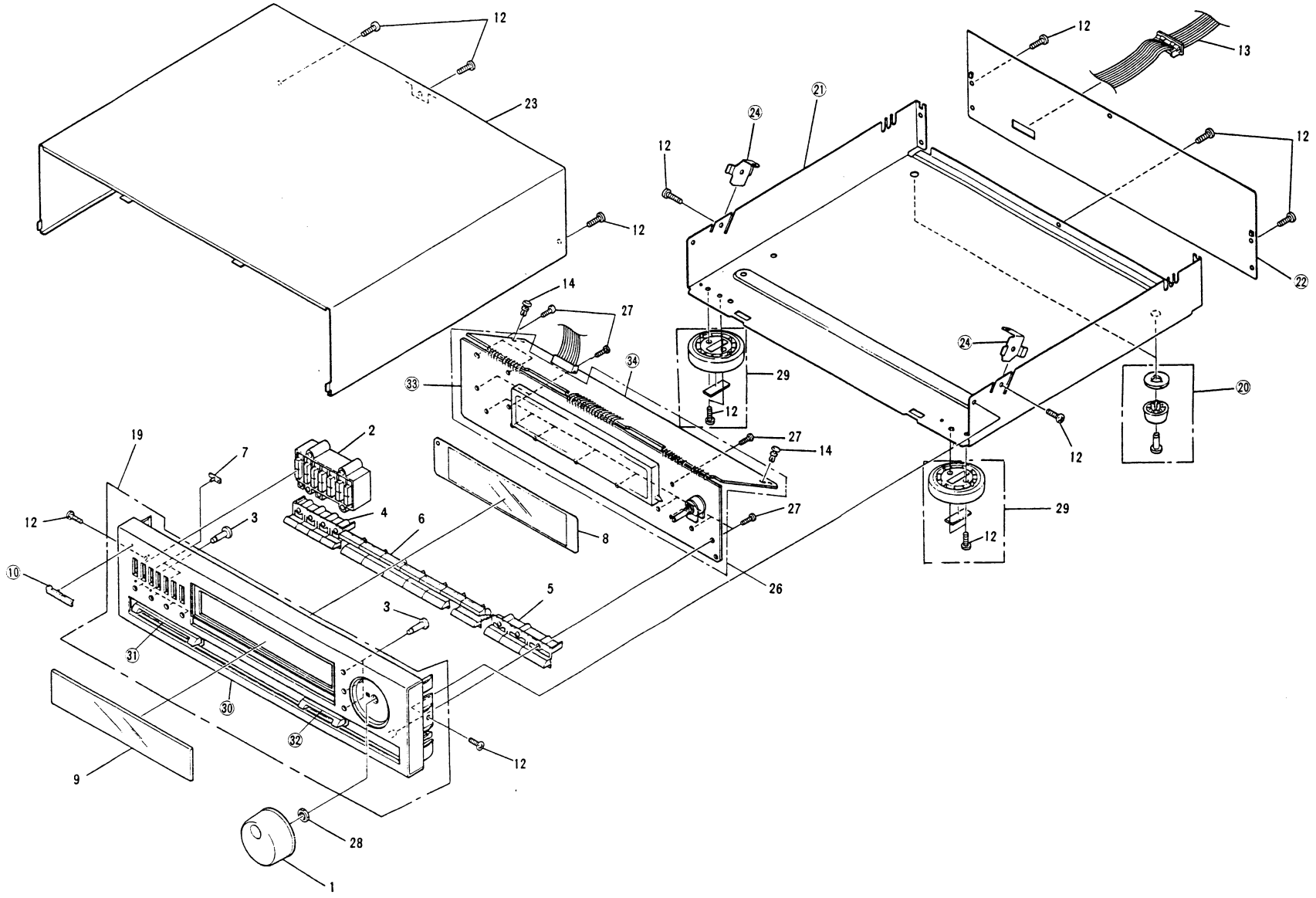
2. EXPLODED VIEWS, PACKING AND PART LIST

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indecates the importance of the safety factor of the part. Therefore, when replacing, be sureto use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Mark NO	Description	Part NO
1	ROTARY KNOB	AAA1005
2	EQUALIZER BUTTON	AAD1681
3	KIN BUTTON	AAD1682
4	EQ MODE BUTTON	AAD1683
5	DES BUTTON	AAD1684
6	SFC MODE BUTTON	AAD1685
7	ACRYLIC LENS S	AAK1758
8	FL FILTER	AAK1763
9	DISPLAY PANEL	AAK1852
10	NAME PLATE (ABS)	
11		-------
12	SCREW	ABA-298
13	CORD WITH PLUG	ADE1072
14	NYLON RIVET	AEC-510
15		-------
16	FR PAD	AHA1269
17	PACKING CASE	AHD1779
18	SHEET	AHG1016
19	FRONT PANEL ASS'Y	AMB1579
20	FOOT ASS'Y (S)	
21	CHASSIS	
22	REAR PANEL	
23	BONNET	ANE1212
24	FITTING (A)	
25		-------
26	SFC CONTROL ASS'Y	AWK1232
27	SCREW	BBZ26P080FMC
28	NUTS	NK70FUC
29	FOOT ASS'Y	RXA1276
30	FRONT PANEL	
31	SASH L	
32	SASH R	
33	DISPLAY ASS'Y	
34	CONTROL ASS'Y	
35	CAUTION ("NOTE")	ARH1047



Note: As to the operating instructions, refer to the Service manual (ARP1929)


12
23
12
14
27
33
34
2
19
7
12
3
4
6
10
8
27
14
27
26
3
5
31
30
32
9
12
28
1
12
13
21
24
12
12
22
24
29
12
20
12
29
12

3. SCHEMATIC DIAGRAM

SFC CONTROL ASSEMBLY (AWK1232)

NOTE:

1. RESISTORS:
   Indicated in Ω, 1/8W & 1/4W, ±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance

2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
   ; DC voltage (V) at no input signal
   Value in ( ) is DC voltage at rated power.
   mA; DC current at no input signal

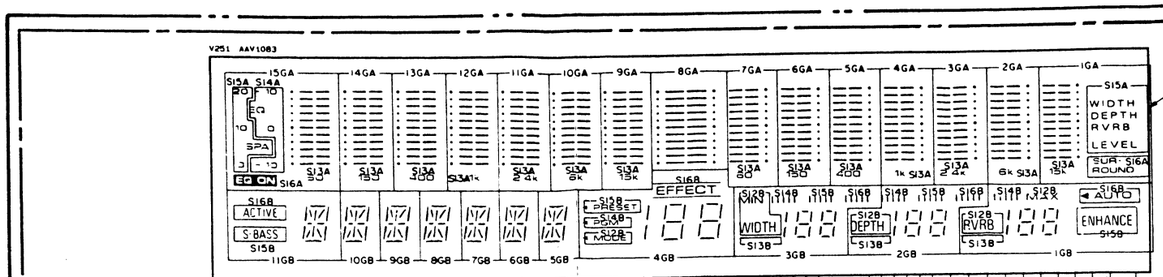
4. OTHERS:

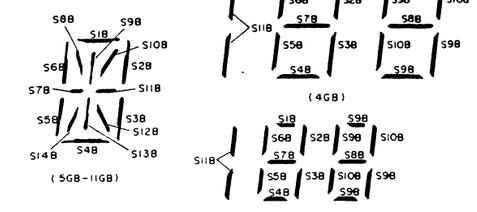
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- * marked capacitors and resistors have parts numbers.
- This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES: The underlined indicates the switch position.

DISPLAY ASSEMBLY

S251: ARENA
S252: THEATER
S253: DISCO
S254: HALL
S255: CHURCH
S256: FLAT
S257: MIRROR
S258: 15kHz +
S259: 6kHz +
S260: 2.4 kHz +
S261: 1kHz +
S262: 400Hz +
S263: 150Hz +
S264: 63Hz +
S265: SUPER BASS
S266: AUTO
S267: STANDARD
S268: MANUAL
S269: RANDOM EQ.
S270: REV
S271: 15kHz —
S272: 6 kHz —
S273: 2.4kHz —
S274: 1kHz —
S275: 400Hz —
S276: 150Hz —
S277: 63Hz —
S278: SURROUND
S279: ENHANCE
S280: DISPLAY
S281: EQ. ON/OFF
S282: ACTIVE LOUDNESS
S283: CAR
S284: HP
S285: MEMORY
S286: PRESET/PGM
S287: ME
S288: MD
S289: MC
S290: HB
S291: MA
S292: SOUND JOG





IC251: DISPLAY CONTROLLER

CONTROL ASSEMBLY

IC101, IC102(2/2): BUFFER

Q101-Q103: MIXER

IC102(1/2), IC103-IC105, Q104-Q106, Q114: B.P.F.

IC101-IC106	NJM4558DXP
IC108	PD3141
IC107	TC4051BP
Q101-Q103, Q107-Q113, Q116	DTC124ES
Q114	2SA1048
Q104-Q106, Q115	2SC2458
D101-D117, D119, D120	HSS104-02
D118	RD5.6ES82

Q107-Q113: B.P.F. RESET

IC107: B.P.F. OUTPUT SELECTOR

IC106(1/2): CONPARATOR

Q116: IC251 POWER ON RESET

IC108: DSP CONTROL MICRO COMPUTER

SPECTRUM ANALYZER CONTROL

DISPLAY ASSEMBLY

IC251	MSC7112
D267·D268	AEL1099
D251-D266	HSS104-02

Does not illuminate.

IC251: DISPLAY CONTROLLER

IC101-IC106 NJM4558DXP
IC108 PD3141
IC107 TC4051BP

Q101-Q103·Q107-Q113·Q116 DTC124ES
Q114 2SA1048
Q104-Q106·Q115 2SC2458

D101-D117·D119·D120 HSS104-02
D118 RD5.6ESB2

Q107-Q113: B.P.F. RESET

IC107: B.P.F. OUTPUT SELECTOR

IC106(1/2): CONPARATOR

Q116: IC251 POWER ON RESET

IC108: DSP CONTROL MICRO COMPUTER

SPECTRUM ANALYZER CONTROL

Q115: μ-COM RESET

SOUND JOG

A-Z560
AF ASSEMBLY
To CN204

PION-02715 / Druck:4

4. P.C. BOARDS CONNECTION DIAGRAM

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

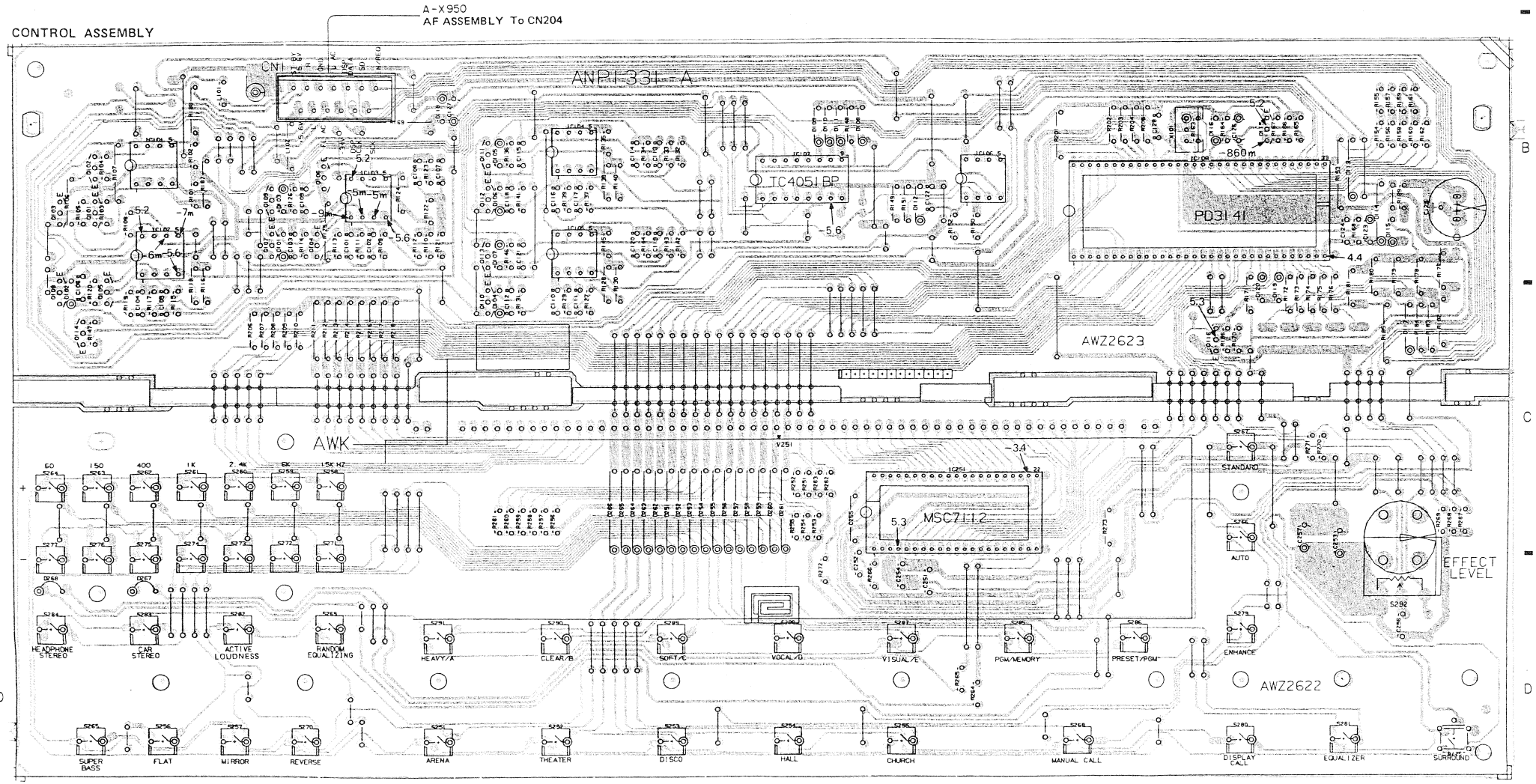
P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
Q504 E C B	Q504 E C B or E C B	Transistor
Q215 E C B	Q215 E C B or E C B	Radiator type transistor
D203	D203	Diode
R237	R237	Resistor
C513	C513	Capacitor (Polarity)
C518	C518	Capacitor (Non-polarity)

Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capacitor terminal marked with (double circles) shows negative terminal.
4. The diode terminal marked with (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

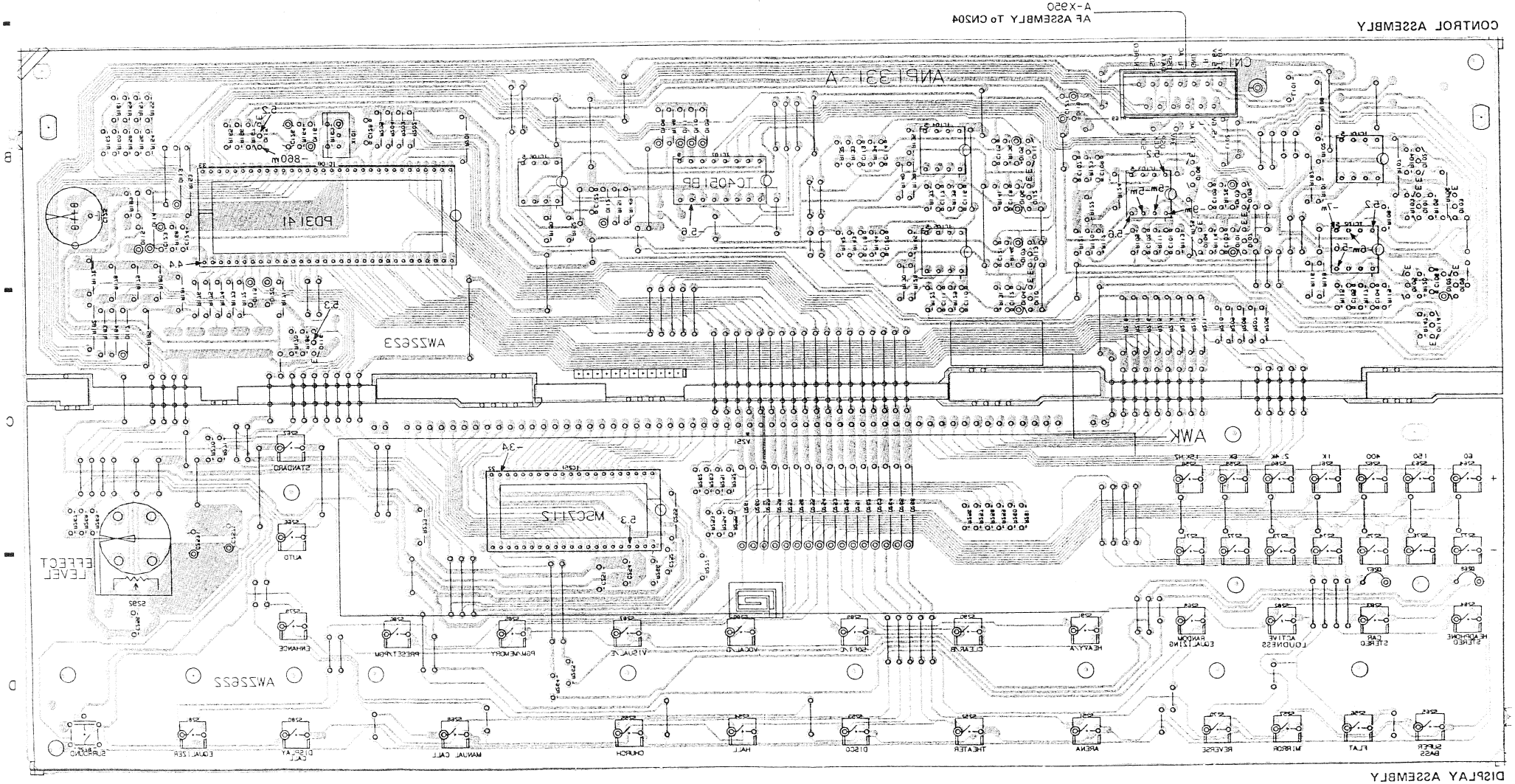
SFC CONTROL ASSY (AWK1232)



This P.C. B. connection diagram is viewed from the foil side.

SFC CONTROL ASSY (AWK1232)

CONTROL ASSEMBLY



5. IC INFORMATION

PD3141

• General

The PD3141 controls various functions of the SP-Z560 and GR-Z460.
The basic functions of the SP-Z560 are explained below.

1. Spectrum analysis and FL display

The SP-Z560 always receives the audio signal detection DC voltage which is A/D converted and split into seven bands x 2, and converts it into the data of eight bands x 2 (level), which are displayed as bar graph on the FL.

2. Control of DSP control IC and FL display

The SP-Z560 transmits the information to be modified by DSP IC (A-Z560's PD0051: IC905) to the DSP control IC (A-Z560's PDG044-A: IC908) (mainly the same data as that displayed). It also displays the data content on the FL as a graph. (*1)

3. Monitoring of various keys and control of system bus

The SP-Z560 always monitors the status of 39 keys, and performs operation corresponding to the input signal. It uses 4-wire I/O signal to perform handshaking with the system bus by serial signal, and then executes analysis of the commands which are entered and also provides internal information.

4. Decoding of rotary encoder

In each program of the sound field control, SP-Z560 raises or lowers the level by the pulse signal sent from the sound job (rotary encoder).

*1: The segments and grids of the SP-Z560's FL are insufficient, and the FL is controlled by the VF display controller MSC7112-01SS (IC251). The PD3141 controls this controller.

• PD3141 terminal function

Pin No.	Terminal name	I/O	Function
1	S5A	O	FL segment signal output terminal
2	S4A	O	
3	S3A	O	
4	S2A	O	
5	S1A	O	
6	1GA	O	FL grid signal output terminal
7	2GA	O	
8	3GA	O	
9	4GA	O	
10	5GA	O	
11	6GA	O	
12	7GA	O	
13	8GA	O	
14	9GA	O	
15	10GA	O	
16	11GA	O	
17	12GA	O	
18	EGA	I	Rotary encoder pulse input (A) (See Fig. 5-1)
19	ECB	I	Rotary encoder pulse input (B) (See Fig. 5-1)
20	13GA	O	FL grid signal output terminal
21	14GA	O	
22	15GA	O	
23	$\overline{B7}$/B9	I/O	Selection between GR-Z460 and SP-Z560 (See Table 5-1.)
24	LOAD	O	MSC7112-01SS (IC251) LOAD control and $\overline{POR}$ control (See Table 5-1.)
25	DATA	O	MSC7112-01SS (IC251) DATA control

Pin No.	Terminal name	I/O	Function
26	SCLK	O	Control of SCLK and POR of MSC7112-01SS (IC251) (See Table 5-1.)
27	DSP DATA	O	Output of A-Z560's PDG044-A (IC905) communication data
28	DSP CLK	O	Output of A-Z560's PDG044-A (IC905) communication CLK
29	SD	I/O	System bus data with A-Z560
30	SCK	I	System bus clock with A-Z560
31	EN/REC (DSP)	I/O	System bus enable/request with A-Z560
32	Vcc	–	+5V power source
33	L/$\overline{R}$	O	L/$\overline{R}$ PBF input selection (H: Lch input, L: Rch input)
34	A	O	TC4051BP (IC107) A control (See Table 5-2.)
35	B	O	TC4051BP (IC107) B control (See Table 5-2.)
36	C	O	TC4051BP (IC107) C control (See Table 5-2.)
37	DA0	O	D/A output (for comparison)
38	DA1	O	
39	DA2	O	
40	DA3	O	
41	DA4	O	
42	CMPIN	I	Input for A/D conversion
43	POWER	I	Power ON/OFF input (power supply error detection) (See Table 5-1.)
44	KEY1	I	Key scan input
45	KEY2	I	
46	KEY3	I	
47	RESET	I	Reset signal input

Pin No.	Terminal name	I/O	Function
48	OSC2	O	4.00 MHz ceramic oscillator connecting terminal
49	OSC1	I	
50	GND	–	Ground
51	CL1	I	Pull-up to Vcc (unused)
52	CL2	O	NC (unused)
53	$\overline{TEST}$	I	Pull-up to Vcc (unused)
54	S16A	O	FL segment output terminal
55	S15A	O	
56	S14A	O	
57	S13A	O	
58	S12A	O	
59	S11A	O	
60	S10A	O	
61	S9A	O	
62	S8A	O	
63	S7A	O	
64	S6A	O	

- **Rotary pulse encoder**

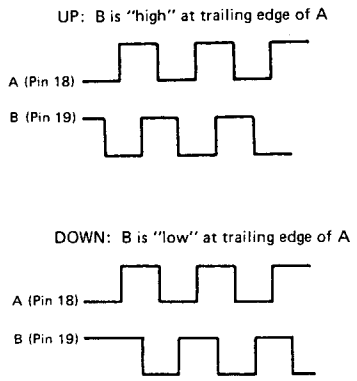


Fig. 5-1 Rotary encoder

- **Port control processing (Special processing)**

Table 5-1 Port control

Pin No.	Terminal name	Function
23	B7/B9	• GR-Z460/SP-Z560 selection (input) This is set immediately after resetting, or when scanning the keys. H: B9 (SP-Z560) L: B7 (GR-Z460)
24	LOAD	• SP-Z560 controls the POR of the display controller (IC251: MSC7112-01SS) by the two ports shown at left. IC RESET is applied if both ports are "high" immediately after POWER ON. This simultaneous "high" state of both ports will not occur during ordinary operation (data transfer).
43	POWER	• POWER ON: H, OFF: L • If this port is "L" continuously for 30 msec after turning OFF power, the backup mode prevails.

- **TC4051BP (IC107) control data**

Table 5-2 IC107 control

Frequency / PD3141 terminal	A (Pin 34)	B (Pin 35)	C (Pin 36)	Switch to be turned ON by TC4051BP (IC107)
15 kHz	0	0	0	a
6 kHz	1	0	0	b
2.4 kHz	0	1	0	c
1 kHz	1	1	0	d
400 Hz	0	0	1	e
150 Hz	1	0	1	f
60 Hz	0	1	1	g

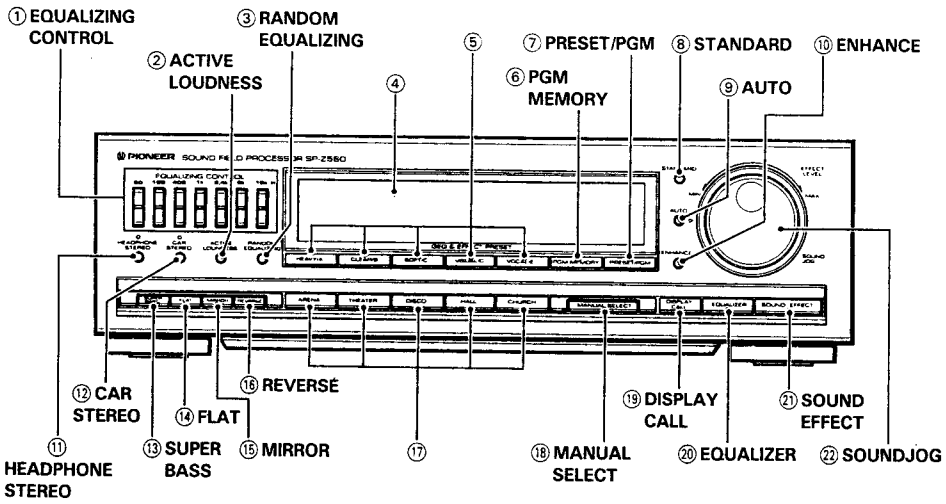
6. SPECIFICATIONS

Graphic equalizer section
Equalizer band
Center frequencies ..... 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz
Variable range ..... ± 7 dB

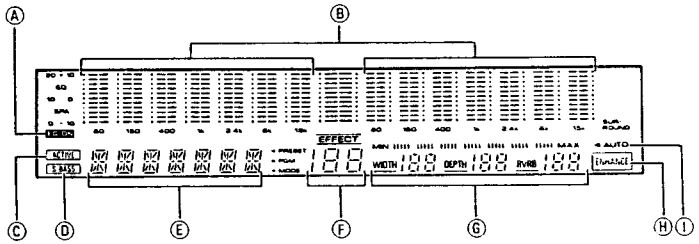
Spectrum analyzer section
Center frequencies..... 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz

Miscellaneous
Dimensions ..... 360 (W) x 332 (D) x 105.5 (H) mm
Weight (without package) ..... 2.8 kg

7. PANEL FACILITIES



Display section



① EQUALIZING CONTROL switches
Use these to adjust equalization of each frequency band.

② ACTIVE LOUDNESS switch
This switches the active loudness function ON and OFF. Depending on the volume setting on the amplifier, this function automatically boosts bass and treble response.

③ RANDOM EQUALIZING switch
This switches the random equalizing function ON. Random equalization patterns for the seven frequency bands are automatically created by this function.
Each time you press it, you get a new equalization pattern. If you press a switch for another operation, for example the REVERSE switch, RANDOM EQUALIZING switches OFF.

④ Display section

⑤ Memory recall switches
Used for recalling sound field memory.

⑥ PGM MEMORY switch
Used for storing sound field you input in the memory recall switches (A - E).

⑦ PRESET/PGM(PROGRAM) switch
Determines whether the sound field recalled by the Memory recall switches are your memorized curves or factory preset curves.

⑧ STANDARD switch
Use this to return to the initial sound field effect level settings.

⑨ AUTO switch
Use this to return to AUTO mode after operating effect level parameters manually.

⑩ ENHANCE switch
This is the acoustic enhancer ON/OFF switch.

⑪ HEADPHONE STEREO switch
Press this switch to recall the optimum equalization settings when recording a tape for headphone stereo listening.
ENHANCE switches OFF.

⑫ CAR STEREO switch
Press this switch to recall the optimum equalization settings when recording a tape for car stereo listening.
ENHANCE switches ON.

NOTE:
When using CAR STEREO and HEADPHONE STEREO, super bass, active loudness, and enhance can be switched ON or OFF.

⑬ SUPER BASS switch
Use this when you want to boost bass level. Press once more to switch it OFF.

⑭ FLAT switch
Use this to make all equalization patterns flat.

⑮ MIRROR switch
Press this switch to change treble and bass equalization patterns in the 1kHz frequency band.

⑯ REVERSE switch
Press this switch to reverse equalization settings so that boosted frequencies will be reduced and vice versa.

⑰ SOUND FIELD selector switches
Use to recall preset sound fields.

⑱ MANUAL SELECT switch
Use this when you want to change sound field parameters manually.

⑲ DISPLAY CALL switch
Use to switch the display mode in the display section. Spectrum analyzer, graphic equalizer, and surround (two types) display is possible.

⑳ EQUALIZER switch
Turns the equalizer on and off. The EQUALIZER indicator lights when this switch is on.

㉑ SOUND EFFECT switch
Use to switch sound field control ON.

㉒ SOUNDJOG dial
Use to adjust sound field effect level, and parameter effect level when in the manual mode.